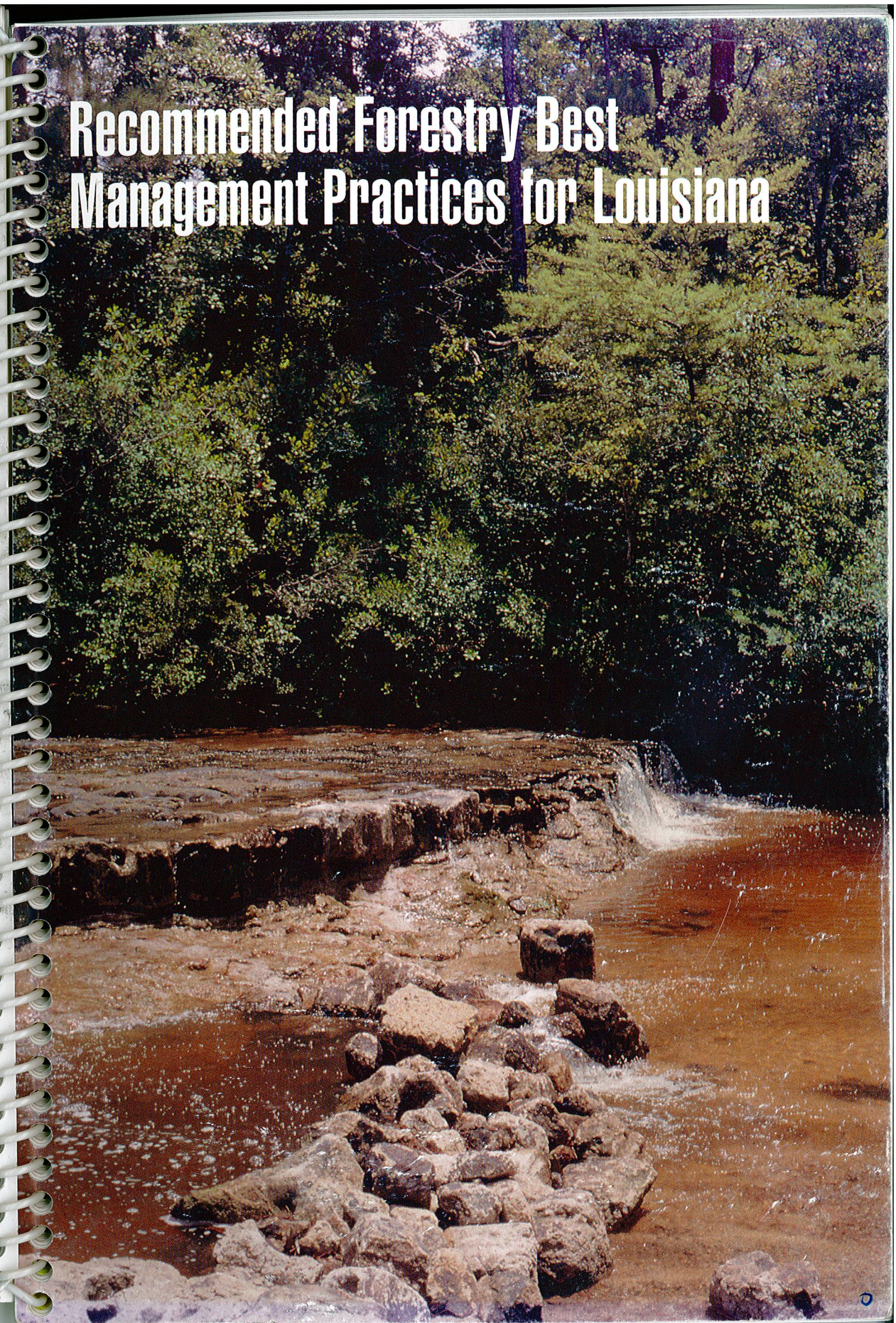


Recommended Forestry Best Management Practices for Louisiana



COVER PHOTO: Pearl Creek in Vernon Parish is part of Louisiana's Natural and Scenic Rivers System.

About the Manual

THIS MANUAL WAS FIRST PRINTED in 2000 after two years of serious study by foresters, soil scientists and engineers to educate the forestry community in effectively managing Louisiana's valuable natural resources. This book was part of a broad undertaking to safeguard the state's land and waters and to wisely use the resources found within Louisiana.

A private-public partnership of the Louisiana Forestry Association (LFA), the Louisiana Department of Environment Quality, and the Louisiana Department of Agriculture and Forestry has formulated this guidebook on the state's non-regulatory Best Management Practices (BMPs). It is hoped that such education will help reduce forest soil movement toward the waters of the state.

This manual is only a small part of this campaign. Significant progress has already been made in the protection of Louisiana's water quality through increased use of BMPs. The latest survey in late 2000 by the Louisiana Office of Forestry showed that 93 percent of logging sites chosen at random were

in compliance with recommended BMPs. This is significant when you consider that the 1985 survey showed only a 10 percent compliance rate.

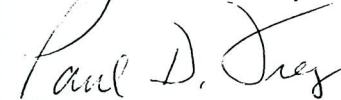
The LAF and The Louisiana Logging Council have also implemented a five-step training curriculum that involves loggers, foresters and landowners. A Master Logger designation recognizes loggers completing 30 hours of training in various aspects of forest management, including BMPs. Master Loggers will complete six hours of continuing education annually to retain that title.

Over the last five years, 3,374 people have attended one or more of these classes and 1,000 loggers have attained Master Logger designation.

These accomplishments have been a great educational undertaking and a great success. We are proud of the progress and look forward to a bright future for Louisiana's forest environment and the forest professionals who provide the resources we grow and use.



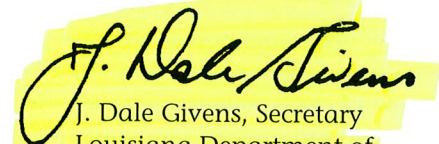
Bob Odom, Commissioner
Louisiana Department of
Agriculture and Forestry



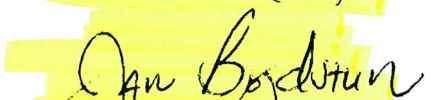
Paul D. Frey
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Louisiana Department of
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Environmental Specialist Coordinator
Louisiana Department of
Environmental Quality



Billy Davis, President
The Louisiana Logging Council

Using the Manual

THIS MANUAL IS WRITTEN TO BE A PRACTICAL FIELD GUIDE for forest landowners, logging contractors and the forest industry, to ensure water quality during forestry operations. It sets forth the voluntary guidelines and procedures to be followed for each operation and describes the federally mandated Best Management Practices (BMPs) for forestry operations in wetlands. Each chapter is written as a stand-alone guide. BMPs common to several operations will appear with each.

In using this manual the information it provides can be divided into four basic parts:

- **Voluntary guidelines, pages 3–29:** Each forestry activity is described and the BMPs associated with that activity are stated.
- **Mandated guidelines, pages 30–49:** Discusses the issue of forest wetlands and sets forth the federally mandated BMPs applicable to forest operations in wetlands. Forest operations in the Louisiana Natural and Scenic Rivers System are also discussed.
- **Glossary, pages 50–54:** Definition of terms used to describe the activities presented in this manual.
- **Recommended examples & tools, pages 55–83:** Detailed examples and tools for implementing the BMPs previously described.

Recommended Forestry Best Management Practices for Louisiana

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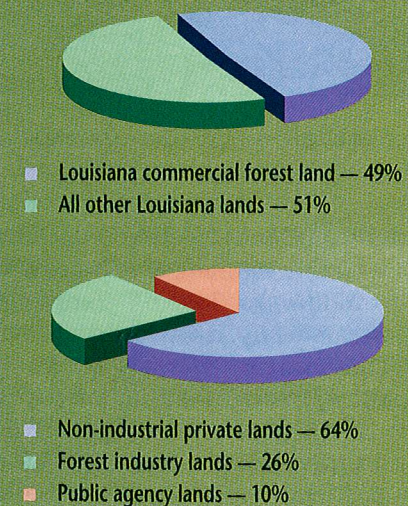
Introduction



COMMERCIAL FORESTS OCCUPY more than 49 percent, or 13.8 million acres, of the land in Louisiana.

Forest ownership here is similar to other southern states. At 64 percent, a majority of the forest land is in nonindustrial private ownership; 26 percent owned by forest industry and the remaining 10 percent held by public agencies.

Status of Louisiana Forests & Lands



Forestry annually contributes more than \$5 billion to the state's economy. If Louisiana is to thrive economically, our forests' ability to produce goods and services must be sustained.

Forest management programs should incorporate adequate measures to provide for proper soil and water conservation. Most streams originating in or flowing

through our timberlands are sources for water supplies, recreation, and other uses.

Section 404 Silvicultural Exemption

In forested wetlands, the Law provides an exemption from permitting under Section 404 for normal ongoing silvicultural operations, provided that the 15 federally mandated best management practices, herein-after referred to as BMPs, are followed.

The Clean Water Act of 1972 (Public Law 92-500) and its amendments mandate water quality sufficient to provide "fishable" and "swimmable" waters. It requires that all **waters of the United States** will be protected from degradation. This includes, but is not limited to, headwater creeks, rich bottomland hardwoods, and permanently flooded cypress-tupelo areas.

The scope of legal jurisdiction was expanded in 1977 by amendments redefining protection to include the **waters of the United States** and their **adjacent wetlands**. This protection, under Section 404, specifies that anyone engaging in activities impacting waters and wetlands is required to secure a permit before proceeding, unless exempted.

Amendments to the Clean Water Act in 1987 required the Louisiana Department of Environmental Quality to assess the quality of water in the state and report its findings to Congress every two years. Under Section 319 of the amended act, the state was also charged with addressing pollution carried to water bodies by rain-

Forest Wetlands

BENEFITS AND FUNCTIONS OF WETLANDS

FOREST WETLANDS ARE ENVIRONMENTALLY SENSITIVE AREAS. Special attention to the proper use of BMPs is essential if water quality is to be protected. Forest road construction has the potential to disrupt normal drainage patterns and produce sediment that may reach streams. Tree tops or other logging debris left in streams can obstruct water flow, increase erosion of stream banks, and decrease dissolved oxygen in the water. Normal wetland drainage patterns can be altered by severe rutting or by improperly constructed windrows. Excessive soil compaction caused by careless logging can reduce water infiltration, reduce soil moisture available to tree roots, and decrease site quality. NOTE: The section on wetlands herein is taken from *Handbook on Forested Wetlands*, Forested Wetlands Workshop, August 8, 1996, Alexandria, Louisiana.

OVERVIEW

Louisiana's bottomland hardwood forests, including wetlands, are productive ecosystems with multiple functions and ecological values that can be managed for commercial timber production without compromising this valuable resource. This section deals with the management of these sites in order that they may continue to provide this ecological value. The reader should keep in mind that many sites classified as bottomlands may be wetland-like, but are not necessarily "wetlands" in the strictest legal or jurisdictional sense. Jurisdictional wetlands are found throughout the state and are not limited to obscure flooded or remote marsh areas.

Maintaining ecological productivity for wetland and wetland-like sites often call for the same management techniques. These wetland BMPs address sustained timber production as one of the landowner's objectives. Timber production is recognized as a land use that is compatible with wetland protection.

Although wetlands are federally regulated, normal forestry operations in wetlands — including but not limited to soil bedding, site

preparation, harvesting, and minor drainage (see note on next page) — are exempt from permit requirements under Section 404 of the Clean Water Act Amendments of 1977, as long as the activity:

- Qualifies as "normal silviculture."
- Is part of an "established" silvicultural operation.
- Does not support the purpose of converting a water of the United States to a use to which it was not previously subject.
- Follows the 15 mandatory BMPs for road construction (see *Access Systems*), and the six mandatory BMPs for site preparation (see *Site Preparation in Wetlands*).
- Contains no toxic pollutant listed under Section 307 of the Clean Water Act in discharge of dredge or fill materials into waters of the United States.

A forestry activity will require a Section 404 permit if it results in the conversion of a wetland to a non-wetland. Landowners who wish to change land use, who feel an activity may change land use, or who are uncertain about the permit exemption

status of a forestry activity should contact the U.S. Army Corps of Engineers (USCOE). If the activity is on a farmed wetland or on

agricultural land, the Natural Resources Conservation Service (NRCS) is the appropriate initial contact.

NOTE: *Minor drainage* refers to installation of ditches or other water control facilities for temporary dewatering of an area. Minor drainage is considered a normal silvicultural activity in wetlands to temporarily lower the water level and minimize adverse impacts on a wetland site during road construction, timber harvesting and reforestation activities. Minor drainage does not include construction of a canal, dike or any other structure which continuously drains or significantly modifies a wetland or other aquatic area.

Minor drainage is exempt from needing an individual 404 permit if it is part of an ongoing silvicultural operation and does not result in the immediate or gradual conversion of a wetland to an upland or other uses. Artificial drainage must be managed. Once silvicultural activity has been completed, the hydrology that existed prior to the activity should be restored by closing drainage channels.

NORMAL SILVICULTURAL ACTIVITIES

Normal silvicultural activities conducted as part of "established, ongoing" silvicultural operations are exempt from Section 404 Corps of Engineers permit requirements as long as the appropriate measures are implemented. Normal activities include but are not limited to road construction, timber harvesting, mechanical or chemical site preparation, reforestation, timberstand improvement and minor drainage. These measures in-

clude 15 federal mandatory BMPs for road construction and the six BMPs for silvicultural site preparation activities in forested wetlands. *Recommended Forestry Best Management Practices for Louisiana* are not required for exemption from Section 404 Corps of Engineers permit requirements; but they are **strongly** recommended to minimize nonpoint source pollution of waters of the state and / or waters of the United States.

ESTABLISHED SILVICULTURAL OPERATIONS

Established or ongoing silvicultural operations are included in a management system (not necessarily written) which is planned over conventional rotation cycles for a property or introduced as part of an established operation. An activity need not itself have been ongoing as long as it is introduced as part of an ongoing operation.

Evidence of use of the property may be used to determine whether an operation is ongoing. Examples of such evidence may include, but not be limited to:

- A history of harvesting with either natural or artificial regeneration.
- A history of fire, insect and disease control to protect the maturing timber.
- The presence of stumps, logging roads, landing or other indications of established silvicultural operations that will continue on the site.
- Explicit treatment of the land as commercial timberlands by government agencies under zoning, tax, subsidy, and regulatory programs.
- Certification under the National Tree

Farm System or Stewardship Program

- Ownership and management by a timber company or individual whose purpose is timber production.

While past management may have been relatively non-intensive, intensification of management involving artificial regeneration and other practices can occur as part of a conventional rotation and be considered an established operation.

Although wetland regulations do not require a written forest management plan, it is in a landowner's best interest to document that operations are established, that BMPs are implemented and effective, and that activities are consistent with other Section 404 exemption criteria.

A change in ownership has no bearing on whether a forestry operation is part of an established, ongoing activity. Continuation or strict adherence to a management plan written for the previous owner is not required by Section 404 silvicultural exemptions.

Note: Forestry activities or operations require a 404 permit from the Corps of Engineers under the conditions listed in the adjacent panel.

A 404 Permit is required when:

- The activity results in the immediate or gradual conversion of a wetland to an upland as a consequence of altering the flow and circulation or reducing the reach of waters of the United States.

Changes in flow, circulation or reach of waters can be affected by permanent major drainage such as channelization or by placement of fill materials. A discharge which changes the bottom elevation of waters of the United States without converting it to dry land, does not reduce the reach of waters but may alter flow or circulation and therefore may be subject to permitting requirements.

The criteria that are used to determine if a wetland has been converted include a change in hydrology, soils and vegetation to such an extent that the area no longer qualifies as a jurisdictional wetland according to the *Federal Manual for Delineating Jurisdictional Wetlands* (1987).

- A new activity results in a change from the past, historical use of the wetland into a different use to which it was not previously subject where the flow of circulation of waters is impaired or the reach of the waters is reduced. Such a change does not meet the established, ongoing requirement and causes the activity or operation to lose its exemption.

Examples of this situation are areas where tree harvesting has been the established use and the landowner wishes to convert the site for use as pasture, green tree reservoir, agriculture, real estate or aquaculture. In such cases, the landowner must first obtain a 404 permit before proceeding with the change.

- Roads and stream crossings are constructed in wetlands without following the mandatory federal BMPs.
- The area has lain idle for so long that hydrologic modifications are necessary to resume operations. This does not refer to temporary water management techniques such as minor drainage, plowing, bedding and seeding which are exempt, normal silvicultural activities as long as they don't result in the conversion of wetlands to uplands. However, it does apply to reopening ditches which were once established as permanent wetland drainage structures but have lost their effectiveness for this purpose as they filled in with soil and vegetation.

Note: Streamside management zones or SMZs should be established and managed around the perimeter of all major drainages and open bodies of water contained within wetlands; for example, mainstream courses or oxbow lakes.

Forest Wetlands

LEGAL DEFINITION OF WETLANDS

The U. S. Army Corps of Engineers (*Federal Register*, 1982) and the Environmental Protection Agency (*Federal Register*, 1980) jointly define wetlands as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support and, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Criteria for Delineating Wetlands

Established by the
U.S. Army Corps of Engineers (USCOE)

- **Hydrophytic vegetation** — plants that have the ability to grow, effectively compete, reproduce, and / or persist in anaerobic soil conditions.
- **Hydric soils** — soils that are saturated, flooded, or ponded long enough during the growing season for anaerobic conditions to develop.
- **Wetland hydrology** — inundated by water sufficient to support hydrophytic vegetation and develop hydric soils.

All three must be present under normal circumstances for an area to be identified as a jurisdictional wetland.

Forest Wetlands

PLANNING IN WETLANDS

Planning for timber harvesting is an often overlooked step in silvicultural activities. When working in wetlands or wetland-like areas, planning is essential. To facilitate planning, identify and mark the location of waterbodies and other sensitive areas using aerial photographs, topographic maps or soil surveys. (See Appendix II, Page 69).



J. Caldwell photo



Louisiana Forestry Association photo

The photos on these two pages illustrate examples of four typical Louisiana wetlands.



J. Caldwell photo



Louisiana Forestry Association photo

PLANNING IN WETLANDS

Forest Wetlands

ACCESS SYSTEMS

Roads provide access for timber removal, fire protection, hunting, routine forest management activities, and other multiple use objectives. When properly constructed and maintained, roads will have minimal impact on water quality, hydrology, and other wetland functions.

MANDATORY ROAD BMPs

As mandated by Amendments to the Clean Water Act, forest roads in jurisdictional wetlands including "waters of the United States" must be constructed and maintained in accordance with the following mandatory Best Management Practices to retain Section 404 exemption status:

15 Federally Mandated BMPs for Roads

1. Permanent roads, temporary access roads, and skid trails in waters of the U.S. shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific silvicultural operations and local topographic and climatic conditions.
2. All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except portions of such roads that must cross water bodies) to minimize discharge of dredged or fill material into waters of the U.S.
3. The road fill shall be bridged, culverted or otherwise designed to prevent the restriction of expected flood flows.
4. The fill shall be properly stabilized and maintained to prevent erosion during and following construction.
5. Discharges of dredged or fill material into waters of the U.S. to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the U.S. (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.
6. In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the U.S. shall be kept to a minimum.
7. The design, construction, and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.
8. Borrow material shall be taken from upland sources whenever feasible.
9. The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species.
10. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist.
11. The discharge shall not be located in the proximity of a public water supply intake.
12. The discharge shall not occur in areas of concentrated shellfish population.
13. The discharge shall not occur in a component of the National Wild and Scenic River System.
14. The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts.
15. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

Forest Wetlands

PERMANENT ROADS

Permanent roads are constructed to provide all or nearly all-season access for silvicultural activities, and are maintained regularly. Construction of permanent roads in wetlands and wetland like areas should be minimized.

BMPs for Permanent Roads

- Construct and maintain permanent roads in forested wetlands according to the 15 mandatory BMPs listed opposite.
- Plan the access system prior to construction. Whenever possible, avoid crossing streams, sloughs, sensitive areas, etc.
- Consider relocating poorly designed or constructed section(s) of an established road system that may lead to water quality pollution during and after the management activity.
- If applicable, construct roads well before the management activity to allow roads to stabilize.
- Construct fill roads only when necessary. Road fills should be as low as possible to natural ground level and should include adequate cross-drains for surface water flow.
- Borrowpits should be located outside smzs and jurisdictional wetlands.
- Stabilize soils around bridges, culverts, low water crossings, etc. When natural stabilization will not occur quickly, fill material should be stabilized with grass, rip-rap, etc.
- Construct fill roads parallel to water flow, where possible.
- Use of a geo-textile or a geo-grid fabric can increase soil bearing capacity and reduce rutting.
- Use board-road or wooden mats where needed to minimize rutting. Stream crossings should be made at right angles to the channel, when possible, and should not impede stream flow.
- Minimize sediment production when installing stream crossings.
- Use gates or otherwise restrict unnecessary traffic on wet roads.
- Road ditches should not feed directly into stream channels.

Forest Wetlands

TEMPORARY ROADS AND SKID TRAILS

Roads provide access for timber removal, fire protection, hunting, routine forest management activities, and other multiple use objectives. When properly constructed and maintained, roads will have minimal impact on water quality, hydrology, and other wetland functions.

BMPs for Temporary Roads and Skid Trails

- Construct and maintain temporary roads in forested wetlands according to the 15 mandatory BMPs.
- Favor temporary roads over permanent roads when possible. When properly constructed, temporary roads will have less impact on the hydrology of forested wetlands than permanent roads.
- Temporary road fill should be removed and the area restored to its original elevation upon completion of operations.

ROAD MAINTENANCE

As mandated by Amendments to the Clean Water Act, forest roads in jurisdictional wetlands including "waters of the United States" must be constructed and maintained in accordance with the following Best Management Practices to retain Section 404 exemption status.

BMPs for Road Maintenance

- All drainage structures should be inspected and maintained, especially following unusually heavy rains.
- Ditches, culverts, and other water flow structures should be kept free of debris.

Forest Wetlands

HARVEST OPERATIONS IN WETLANDS

Harvesting should be done with consideration to season, stand composition, soil type, soil moisture, and the type of equipment that is used. When done correctly, harvesting can benefit site productivity for future forests, improve regeneration, and benefit the overall hydrologic function of a wetland site.

BMPs for Wetland Harvest Operations

- Harvest during dry periods if possible to minimize rutting.
- Use low pressure / high flotation tires or wide tracks where possible, so that excessive damage to residual stand will not occur.
- Keep skidder loads light when rutting is evident.
- Fell trees away from watercourses if possible.
- During harvesting, remove any obstructions in channels resulting from harvesting operations.
- Limit operations on sensitive sites and in smzs during periods of wet weather.

RUTTING

Ruts should not be present to the extent that they impede, restrict, or change natural water flows and drainages. The determination of excessive rutting is highly subjective and must be made

only by a forester or other qualified individual who evaluates rutting extent, depth, soil type, direction and position, and other local factors.

Forest Wetlands

SITE PREPARATION IN WETLANDS

Site preparation activities in forested wetlands for the establishment of pine plantations¹ in Louisiana may or may not require a Clean Water Act Section 404 permit.

NO PERMIT REQUIRED

The following are circumstances where mechanical site preparation activities do not require a permit:

- **Mechanical silvicultural site preparation²** is a non-permitted activity in wetlands that are:

Seasonally flooded — Characterized by surface water that is present for extended periods, especially early in growing season and is absent by the end of the season in most years but water table is often near the surface.

Intermittently flooded — Characterized by substrate that is usually exposed, but where surface water is present for variable periods without detectable season periodicity.

Temporarily flooded or saturated — Characterized by surface water that is present for brief periods during the growing season, but also by a water table that usually lies well below the soil surface for most of the season.

Historically 25% or more pine — Conducted in pine plantations and other silvicultural sites that originally or historically contained more than 25% pine in the canopy (except as listed under "permit required," next page — circumstances which do require a permit). Examples typical of these wetlands include pine flatwoods, pond pine flatwoods and wet flats, such as certain pine-hardwood forests.

- The site preparation activity is conducted in a manner designed to minimize impacts to the aquatic ecosystem and are conducted according to the six BMPs³ listed below:

Minimize soil disturbance — Position shear blades or rakes at or near the soil surface and windrow, pile, and otherwise move logs and logging debris by methods that minimize dragging or pushing through the soil to minimize soil disturbance associated with shearing, raking, and moving trees, stumps, brush, and other unwanted vegetation.

Avoid soil compaction — Conduct activities in such a manner as to avoid excessive soil compaction and maintain soil tilth.

¹ These guidelines were developed for the establishment of pine plantations and does not apply to, restrict, or require a permit for mechanical site preparation for the establishment of hardwood plantations.

² Mechanical silvicultural site preparation activities include shearing, raking, ripping, chopping, windrowing, piling and other similar methods used to cut, break apart, or move logging and other debris following harvesting for the establishment of pine plantations.

³ These BMPs firmly establish that forestry site preparation activities including shearing, raking, moving logging slash, windrowing, piling, etc. are part of normal silviculture; therefore, implementation of the mechanical site preparations BMPs does not constitute "land clearing" or other non-exempt activities.

Limit erosion and runoff — Arrange windrows in such a manner as to limit erosion, overland flow, and runoff.

Keep logging debris out of smzs — Prevent disposal or storage of logs or logging debris in stream-side management zones (defined areas adjacent to streams, lakes, and other waterbodies) to protect water quality.

Maintain natural contour and drainage — Maintain the natural contour of the site and ensure that activities do not immediately or gradually convert the wetland to a non-wetland.

Exercise water management — Conduct activities with appropriate water management mechanisms to minimize off-site water quality impacts.

PERMIT REQUIRED

The following are circumstances where mechanical site preparation activities require a permit:

- A permit will be required in the following areas unless they have been so altered through past practices (including the installation and continuous maintenance of water management structures) as to no longer exhibit the distinguishing characteristics described below (see "circumstances where mechanical silvicultural site preparation activities do not require a permit" above).

Permanently flooded, intermittently exposed, and semi-permanent flooded wetlands

Permanently flooded wetlands — characterized by water that covers land surface throughout the year in all years.

Intermittently exposed wetlands — characterized by surface water throughout the year except in years of extreme drought.

Semi-permanently flooded wetlands — characterized by surface water throughout the growing season in most years and when absent, the water table is usually at or near the land surface. Examples of these three types include cypress gum swamps, muck and peat swamps and cypress strands / domes.

Riverine bottomland hardwood wetlands

Seasonally flooded floodplains — characterized by seasonally flooded or wetter river floodplain sites where overbank flooding has resulted in alluvial features such as well-defined floodplains, bottom / terraces, natural levees, and backswamps. Surface water present for extended periods, especially early in growing season, but absent by end of the season in most years, but water table often near land surface. Field indicators include water-stained leaves, drift lines and water marks on trees.

Hardwoods dominant — hardwoods dominate the canopy but do not include sites where more than 25% of canopy is pine.

Poorly drained soils — soil characteristics include listed hydric soils that are poorly drained or very poorly drained.

Non-riverine forest wetlands — Are rare, high-quality, wet forests with mature vegetation; located on the southeastern coastal plains, with hydrology dominated by high water tables representing two forest community types.

Non-riverine wet hardwood forests — poorly drained mineral soil interstream flats (comprising 10 or more contiguous acres), typically on the margins of larger peatland areas, seasonally flooded or saturated by high water tables, with vegetation dominated (greater than 50% of basal area per acre) by swamp chestnut oak, cherrybark oak, or laurel oak alone or in combination.

Non-riverine swamp forests — very poorly drained flats (comprising 5 or more contiguous acres), with organic soils or mineral soils with high organic content, seasonally to frequently flooded or saturated by high water tables, with vegetation dominated by bald cypress,

pond cypress, swamp tupelo, water tupelo, or Atlantic white cedar alone or in combination.

The term "high quality" refers to generally undisturbed forest stands, whose character is not significantly affected by human activities such as forest management. Non-riverine forest wetlands dominated by red maple, sweetgum, or loblolly pine alone or in combination are not considered to be of high quality, and do not require a permit.

Tidal freshwater marshes — Wetlands regularly or irregularly flooded by freshwater with dense herbaceous vegetation, on the margins of estuaries or drowned rivers or creeks.

Maritime grasslands, shrub swamps and swamp forests — Barrier island wetlands in dune swales and flats; underlain by wet, murky or sandy soils, vegetated by wetland herbs, shrubs and trees.

Four other wetland types in addition to the five above — white cedar swamps, Carolina bay wetlands, low pocosin wetlands and wet marl forests — require a permit for mechanical silvicultural site preparation, but are not normally found in Louisiana.

Note: Pine plantations that have already been established in the nine wetland types are grandfathered and not subject to the above prohibition. Thus, if a pine plantation already exists in the wetland types, no permit will be required for mechanical site preparation in order to continue pine plantation management on that site. Further, it is important to note that the above prohibition against mechanical site preparation in the above wetlands does not preclude pine management all together. Pine management can occur as long as the pine trees can be established consistent with the other clearly exempt activities including, harvesting, minor drainage, seeding, plowing and cultivating.

BMPs for Pine Wetlands

- Site preparation in forested wetlands, as outlined under *Permanently flooded wetlands* above, should be conducted according to the six BMPs listed under **Riverine bottomland hardwood wetlands** on page 41.

AVOID

- Permanently flooded, intermittently exposed and semi-permanent flooded wetlands.
- Riverine bottomland hardwood wetlands.
- Non-riverine forest wetlands.
- Tidal freshwater marshes.
- Maritime grasslands, shrub swamps and swamp forests.

MY PROJECTS ARE ESTABLISHED PINE PLANTATIONS FOR MANY YEARS

Forest Wetlands

REFORESTATION IN WETLANDS

Reforestation in wetlands is not much different from regenerating uplands, with regard to water quality; the main factors to consider are the sites' potential for erosion and sedimentation, and for hydrology.

FOREST CHEMICALS IN WETLANDS

Use of chemical treatment should be limited within an smz because of their pollution potential. Application of pesticides, including herbicides, should be made by injection or directly. Forest fertilizer should be applied in such a manner (such as rate, time, or frequency of application) to prevent soil or water pollution. If state and federal laws

regarding the proper use of silvicultural chemicals are adhered to and manufacturers label directions followed, the judicious use of chemicals should not jeopardize an smz or the water it protects. Care should also be taken in areas adjacent to an smz to prevent the drift, spill, seepage, or wash of chemicals into the smz or watercourse.

BMPs for Chemicals in Wetlands

- Follow all label instructions to the letter. Be aware that some chemicals are labeled for use in wetlands and some are not.
- Conduct applications by skilled and, if required, licensed applicants.
- Identify and establish buffer areas for moving surface waters, especially for aerial applications.

AVOID

- Do not allow spray or rinse water to enter smzs.